

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 20 November 2000 (20.11.00)	
International application No. PCT/GB00/00969	Applicant's or agent's file reference 300
International filing date (day/month/year) 15 March 2000 (15.03.00)	Priority date (day/month/year) 18 March 1999 (18.03.99)
Applicant MILLAR, John, William, Aidan et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

16 October 2000 (16.10.00)

☐ in a notice effecting later election filed with the International Bureau on:
2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

BEST AVAILABLE COPY

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Pascal Piriou Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

9/936790

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

COHEN, Alan, Nicol
2 Grove Place
Tatsfield
Westerham
Kent TN16 2BB
ROYAUME-UNI

Date of mailing (day/month/year) 11 October 2001 (11.10.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 300	
International application No. PCT/GB00/00969	International filing date (day/month/year) 15 March 2000 (15.03.00)

1. The following indications appeared on record concerning:

☒ the applicant

 ☒ the inventor

 ☐ the agent

 ☐ the common representative

Name and Address

MILLAR, John, William, Aidan
The Flat, Noremarsh Farm
Noremarsh Road
Wootton Bassett
Swindon
Wiltshire SN4 8BN
United Kingdom

State of Nationality

GB

State of Residence

GB

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person

 ☐ the name

 ☒ the address

 ☐ the nationality

 ☐ the residence

Name and Address

MILLAR, John, William, Aidan
1 Kennet View
Fyfield
Marlborough
Wiltshire SN8 1PU
United Kingdom

State of Nationality

GB

State of Residence

GB

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Dominique DELMAS

Telephone No.: (41-22) 338.83.38

BEST AVAILABLE COPY

PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

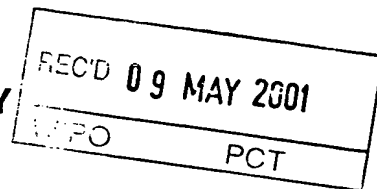
To:

COHEN, Alan, Nicol
2 Grove Place
Tatsfield
Westerham
Kent TN16 2BB
ROYAUME-UNI

Date of mailing (day/month/year) 03 October 2001 (03.10.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 300	
International application No. PCT/GB00/00969	International filing date (day/month/year) 15 March 2000 (15.03.00)

1. The following indications appeared on record concerning:			
<input checked="" type="checkbox"/> the applicant	<input checked="" type="checkbox"/> the inventor	<input type="checkbox"/> the agent	<input type="checkbox"/> the common representative
Name and Address		State of Nationality	State of Residence
		Telephone No.	
		Facsimile No.	
		Teleprinter No.	
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:			
<input type="checkbox"/> the person	<input type="checkbox"/> the name	<input type="checkbox"/> the address	<input type="checkbox"/> the nationality <input type="checkbox"/> the residence
Name and Address BRUGES, William, Peter, Stuart Manor Farm House Deane Basingstoke Hampshire RG25 3AS United Kingdom		State of Nationality GB	State of Residence GB
		Telephone No.	
		Facsimile No.	
		Teleprinter No.	
3. Further observations, if necessary: Additional applicant/inventor for the purposes of US only.			
4. A copy of this notification has been sent to:			
<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned		
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned		
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:		

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Dominique DELMAS Telephone No.: (41-22) 338.83.38
--	---



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

4

Applicant's or agent's file reference 300	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/00969	International filing date (day/month/year) 15/03/2000	Priority date (day/month/year) 18/03/1999
International Patent Classification (IPC) or national classification and IPC G01V3/26		
Applicant GROUNDFLOW LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 16/10/2000	Date of completion of this report 07.05.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Passier, M Telephone No. +49 89 2399 2178 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB00/00969

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-7 as originally filed

Claims, No.:

1-22 as originally filed

Drawings, sheets:

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB00/00969

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	5-7,9-13,15-20,22
	No:	Claims	1-4,8,14,21
Inventive step (IS)	Yes:	Claims	5-7,19,20
	No:	Claims	9-13,15-18,22
Industrial applicability (IA)	Yes:	Claims	1-22
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item V

1. Prior Art

The following documents are cited in the international search report and are referred to in this communication:

D1: US-A-5 689 068

D2: WO 97 14980 A

2. Technical Field

The invention relates to electrokinetic determination of subsurface formation parameters.

3. Article 33(1),(2) PCT (Novelty)

1. The **claims 1-4, 8, 14 and 21** do not meet the novelty requirement of the PCT for the following reasons:
2. Concerning **claims 1, 2 and 14**: document D1 (e.g. col. 1, lines 5-10 and col. 4, lines 3-37) discloses an apparatus, that may comprise a casing (50), and method for measuring rock properties around a borehole. A pressure, i.e. seismic, signal is generated downhole and propagates into the surrounding formation whereby an electrokinetic signal is generated. This signal is detected by receivers (abstract, figs. 1-4). In D1 the phase difference between two individual source signals is varied (c.3,l.10-15; c.3,l.31-37; c.4,l.48-59; c.5,l.42-46). This inevitably leads to the spatial distribution, location and direction of the outgoing seismic signal being adjusted so that the electrokinetic signals are generated from different zones around the seismic source.
3. Concerning **claims 8 and 21**: as mentioned above, D1 discloses that the spatial distribution, location and direction of the seismic signal are changed by wave interference of signals from two sources between which the phase difference varies.
4. Concerning **claim 3**: the setup of fig. 3 of D1 together with changing phase difference between the sources results in an azimuthally varying direction of the seismic signal in three dimensions (the seismic energy will propagate through a three-dimensional volume between the two sources) with respect to the source of the seismic shock.

5. Concerning **claim 4**: the setups of D1 (figs. 2-4) together with changing phase difference between the sources result in a distribution of seismic shock directions from which two directions can easily be found whereby the second direction can be obtained by radial rotation of the first direction about a circle with the seismic source at its centre.
6. It is further noted that the expressions "in three dimensions azimuthally with respect to the seismic source" (claim 3) and "rotated radially about a circle with the seismic source at its centre" (claim 4) do not unambiguously imply a full coverage of the radial and azimuthal field. Apart from indeed covering this meaning, these expressions also cover variations of the seismic shock direction with respect to the seismic source within a three-dimensional subspace, i.e variations over a limited range of directions. As explained above, it is this latter meaning that is anticipated by D1.
7. The **claims 5-7, 9-13, 15-20 and 22** meet the novelty requirement of the PCT.

4. Article 33(1),(3) PCT (Inventive Step)

1. The dependent **claims 9-13, 15-18 and 22** do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT with respect to inventive step, the reasons being as follows:
2. Concerning **claims 10 and 22**: all features of these claims are covered by D1 (see point 3. above) except for the seismic signal propagating in all directions. This feature enables investigation of formation parameters in all directions and is described in D2 as being employed for the same purpose in a device and method for electrokinetic determination of rock properties surrounding a bore hole. The skilled person would therefore not hesitate to consider omni-directional propagation in order to enable investigation of formation parameters in all directions.
3. Concerning **claims 9, 11-13 and 15-18**: the additional features introduced by these claims are identically mentioned in document D2. The skilled person would therefore not hesitate to consider the respective features in order to design an electrokinetic logging method and device.

4. The dependent **claims 5-7, 19 and 20** meet the requirements of the PCT with respect to inventive step, because these claims introduce features in order to define ways of adjusting the direction of the seismic shock. These features are not disclosed or hinted at in the available documents.
5. **Article 33(1),(4) PCT (Industrial Applicability)**
Beyond any doubt, the invention is industrially applicable.

Re Item VII

1. In order to meet the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in document D1 should have been mentioned in the description, and the document should have been identified therein.
2. The independent claims are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would have been appropriate.

Re Item VIII

Article 6 PCT (Lack of Clarity)

1. The feature "Apparatus ... in which the are ... acting together" in the apparatus **claim 21** relates to a method of using the apparatus (i.e., a limitation of the apparatus claim to the manner in which the device is used). Contrary to the requirements of Article 6 PCT, the wording of the claim thus leaves doubt as to its category (see also PCT Guidelines III-4.1).
2. Also in method **claim 10** the wording of the claim leaves doubt as to its category, since this method claim defines apparatus features: "A method ... in which there are ... sources ... and there are means to vary ... independently". This leaves claim 10 unclear.
3. **Claim 10** is further unclear, because of "the direction ... can be varied in three dimensions". This wording leaves it unclear whether the claimed method actually comprises the step of varying in three dimensions or not.

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 299	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 00/ 00968	International filing date (day/month/year) 15/03/2000	(Earliest) Priority Date (day/month/year) 18/03/1999
Applicant GROUNDFLOW LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of Invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawing to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1
☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/00968

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G01V3/26 E21B47/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 G01V E21B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 97 14980 A (MILLAR JOHN WILLIAM AIDAN ;CLARKE RICHARD HEDLEY (GB)) 24 April 1997 (1997-04-24) page 3, line 17 - line 25 page 4, line 9 - line 17 page 5, line 15 - line 19	1-3,5-9
Y	US 4 804 918 A (VAIL III WILLIAM B) 14 February 1989 (1989-02-14) column 5, line 42 -column 6, line 7	1-3,5-9
Y	WO 93 07514 A (ATLANTIC RICHFIELD CO) 15 April 1993 (1993-04-15) abstract; figure 2	9
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

30 June 2000

Date of mailing of the international search report

07/07/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Garrido Garcia, M

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/00968

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 403 146 A (NEUFELD JACOB) 6 September 1983 (1983-09-06) column 6, line 61 - line 67 column 7, line 31 - line 45 -----	1-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/00968

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 9714980	A	24-04-1997	AU	7312396 A	07-05-1997
			CA	2234258 A	24-04-1997
			EP	0856163 A	05-08-1998
			NO	981570 A	09-06-1998
US 4804918	A	14-02-1989	US	4724385 A	09-02-1988
WO 9307514	A	15-04-1993	AU	2865792 A	03-05-1993
			US	5881310 A	09-03-1999
US 4403146	A	06-09-1983	US	4503328 A	05-03-1985
			US	4326129 A	20-04-1982

PATENT COOPERATION TREATY

PTD

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

<p>To:</p> <p>COHEN, Alan, Nicol 2 Grove Place Tatsfield Westerham Kent TN16 2BB GRANDE BRETAGNE</p>
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PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

<p>Applicant's or agent's file reference 299</p>	<p>IMPORTANT NOTIFICATION</p>	
<p>International application No. PCT/GB00/00968</p>	<p>International filing date (day/month/year) 15/03/2000</p>	<p>Priority date (day/month/year) 18/03/1999</p>
<p>Applicant GROUNDFLOW LIMITED et al.</p>		


1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

<p>Name and mailing address of the IPEA/</p> <p>European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465</p>	<p>Authorized officer</p> <p>De Caemel, J-M</p> <p>Tel. +49 89 2399-2557</p>	
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 299	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/00968	International filing date (day/month/year) 15/03/2000	Priority date (day/month/year) 18/03/1999
International Patent Classification (IPC) or national classification and IPC G01V3/26		
Applicant GROUNDFLOW LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 4 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 16/10/2000	Date of completion of this report 29.12.2000
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Whittington, J Telephone No. +49 89 2399 2781 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/00968

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

Description, pages:

1-8 as originally filed

Claims, No.:

1-19 as originally filed

Drawings, sheets:

1/2-2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB00/00968

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-19
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-19
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-19
	No:	Claims	

2. Citations and explanations
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/00968

Section V:

- D1: WO 97 14980 A (MILLAR JOHN WILLIAM AIDAN ;CLARKE RICHARD HEDLEY (GB)) 24 April 1997 (1997-04-24)
- D2: US-A-4 804 918 (VAIL III WILLIAM B) 14 February 1989 (1989-02-14)
- D3: WO 93 07514 A (ATLANTIC RICHFIELD CO) 15 April 1993 (1993-04-15)

The invention of the present application resides in the unexpected discovery that it is possible to detect electro kinetically induced formation electrical signals via and through the metal casing wall of a cased borehole. Seismic induced electrokinetic petrophysical investigation is known in open hole (using a logging sonde), but this has never been tried in cased hole, and conventional wisdom would teach away from even attempting such a technique.

D1 describes conventional open hole seismic electrokenesis, while D3 describes LWD seismic assessment. D2 exploits a different technique("APLE") which uses an acoustic signal in cased hole at the Lamor frequency to effect local magnetic fields, which can, obviously, be detected through metal casing.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 300	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 00/ 00969	International filing date (day/month/year) 15/03/2000	(Earliest) Priority Date (day/month/year) 18/03/1999
Applicant GROUNDFLOW LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☒ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1
☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

GB 00/00969

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G01V3/26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01V

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 689 068 A (LOCATELLI MARCEL ET AL) 18 November 1997 (1997-11-18) column 1, line 5 - line 60 column 2, line 21 - line 44 column 3, line 7 - line 10 column 4, line 48 - line 54 column 5, line 1 - line 6 claims 1,5,6,8,14; figures 2,3	1,3,8,9, 14,19,21
Y	---	2,10-13, 15,16, 18,22
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

20 July 2000

Date of mailing of the international search report

27/07/2000

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INTERNATIONAL SEARCH REPORT

International Application No

GB 00/00969

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 97 14980 A (MILLAR JOHN WILLIAM AIDAN ;CLARKE RICHARD HEDLEY (GB)) 24 April 1997 (1997-04-24) cited in the application page 3, paragraph 4; claims 13,15-17	2,12,13, 18
A	----	4-7,17, 20
Y	GB 2 318 185 A (SCHLUMBERGER LTD) 15 April 1998 (1998-04-15) page 9, column 24 -page 10, column 11	10,11, 15,16,22
A	US 4 043 192 A (SHUCK LOWELL Z) 23 August 1977 (1977-08-23) claim 1; figure 1 -----	7,17,20

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

/GB 00/00969

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5689068	A	18-11-1997	FR 2729222 A EP 0722095 A	12-07-1996 17-07-1996
WO 9714980	A	24-04-1997	AU 7312396 A CA 2234258 A EP 0856163 A NO 981570 A	07-05-1997 24-04-1997 05-08-1998 09-06-1998
GB 2318185	A	15-04-1998	CA 2217596 A FR 2754607 A NO 974704 A	11-04-1998 17-04-1998 14-04-1998
US 4043192	A	23-08-1977	NONE	